

# Claims

- [c1] 1.A gradient coil assembly for use in an MRI device, comprising:  
a first tube extending along an axis including a first conductor;  
a second tube disposed generally concentrically about the first tube wherein an inner space is defined between the first and second tubes, the second tube including a second conductor; and,  
a fiber composite structure disposed in the inner space operatively associated with the first and second tubes to increase a stiffness of the assembly.
- [c2] 2.The gradient coil assembly of claim 1 wherein the fiber composite structure is constructed from a resin and fibers disposed in the resin.
- [c3] 3.The gradient coil assembly of claim 2 wherein the fiber composite structure has a fiber to resin ratio equal to or greater than 90%.
- [c4] 4.The gradient coil assembly of claim 2 wherein the fibers comprise one of glass fibers, carbon fibers, Kevlar fibers, and aluminum oxide fibers, or a combination of

fibers comprising at least one of the foregoing fibers.

- [c5] 5.The gradient coil assembly of claim 2 wherein the resin comprises an epoxy resin.
- [c6] 6.The gradient coil assembly of claim 2 wherein a temperature of the resin where the resin becomes non-elastic is greater than an operating temperature of the coil assembly.
- [c7] 7.The gradient coil assembly of claim 1 wherein the fiber composite structure comprises a plurality of radially extending fins.
- [c8] 8.The gradient coil assembly of claim 7 wherein spaces between each of the plurality of radially extending fins in the inner space is filled with resin.
- [c9] 9.The gradient coil assembly of claim 1 wherein the plurality of radially extending fins extend substantially from the first tube to the second tube.
- [c10] 10.The gradient coil assembly of claim 1 further comprising at least one viscoelastic member disposed in the inner space to dampen vibrations in the assembly.
- [c11] 11. The gradient coil assembly of claim 1 wherein the first conductor is disposed on an exterior surface of the first tube.

- [c12] 12.The gradient coil assembly of claim 1 wherein the second conductor is disposed on an exterior surface of the second tube.
- [c13] 13.A gradient coil assembly, comprising:  
a first tube extending along an axis including a first conductor;  
a second tube disposed generally concentrically about the first tube wherein an inner space is defined between the first and second tube, the second tube including a second conductor; and,  
a fiber composite structure having resin and fibers disposed in the resin, the structure having a plurality of radially extending fins being disposed in the inner space to increase a stiffness of the assembly.
- [c14] 14.The gradient coil assembly of claim 13 wherein the fiber composite structure has a fiber to resin ratio equal to or greater than 90%.
- [c15] 15.The gradient coil assembly of claim 13 wherein the fibers comprise one of glass fibers, carbon fibers, Kevlar fibers, and aluminum oxide fibers, or a combination of fibers comprising at least one of the foregoing fibers.
- [c16] 16.The gradient coil assembly of claim 13 wherein the resin comprises an epoxy resin.

- [c17] 17. The gradient coil assembly of claim 13 wherein a temperature of the resin where the resin becomes non-elastic is greater than an operating temperature of the coil assembly.
- [c18] 18. The gradient coil assembly of claim 13 wherein spaces between each of the plurality of radially extending fins in the inner space is filled with resin.
- [c19] 19. The gradient coil assembly of claim 13 wherein the plurality of radially extending fins extending substantially from the first tube to the second tube.
- [c20] 20. The gradient coil assembly of claim 13 further comprising at least one viscoelastic member disposed in the inner space to dampen vibrations in the assembly.
- [c21] 21. A method for assembling a gradient coil assembly for use in an MRI device, comprising:  
disposing a first gradient tube generally concentrically about a second gradient tube wherein an inner space is defined between the first and second gradient tubes;  
and,  
disposing a fiber composite structure in the inner space defined by the first and second gradient tubes.